

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF CLAIMS:

1.(original) A separation apparatus comprising:

a channel through which a sample containing components-to-be-separated moves;

one, or two or more check valves disposed in said channel, suppressing back flow of said components-to-be-separated;

a plurality of compartments partitioned by said check valve(s); and

an external force imposing unit imposing external force to said components-to-be-separated so as to allow them to move through said channel,

wherein said external force imposing unit has a function of alternately executing a first external force imposing pattern by which the external force is imposed to said components-to-be-separated in the forward direction along said channel, and a second external force imposing pattern by which the external force is imposed to said components-to-be-separated in the direction opposite to the forward direction along said channel, to thereby fractionate said components-to-be-separated into any of said compartments.

2.(original) The separation apparatus according to Claim 1, wherein said channel is formed so as to extend in a straight form.

3.(currently amended) The separation apparatus according to Claim 1 [[or 2], wherein said check valves are formed so as to

block back flow of at least a part of said components-to-be-separated flew through each of said check valves and moved to the downstream side of said channel.

4. (currently amended) The separation apparatus according to ~~any one of Claims 1 to 3~~ claim 1, wherein said external force imposing unit includes a plurality of electrodes provided to both ends of said channel, and has a function of executing said first external force imposing pattern and said second external force imposing pattern by changing direction of voltage to be applied between said electrodes.

5. (original) A separation apparatus comprising:

- a channel through which a sample containing components-to-be-separated moves;

- interception units intercepting said components-to-be-separated moving through said channel in the sample forwarding direction of said channel;

- a plurality of compartments partitioned by adjacent ones of said interception units; and

- an external force imposing unit imposing external force to said components-to-be-separated so as to allow them to move through said channel,

- wherein said external force imposing unit has a function of sequentially executing a plurality of external force imposing patterns differing in external force component in the sample forwarding direction in the channel in the individual compartments, so as to fractionate said components-to-be-separated into any of said compartments.

6. (original) The separation apparatus according to Claim 5, wherein said external force imposing unit is configured to impose external force so as to substantially

equalize magnitude of the external force imposed to said components-to-be-separated in each of said compartments.

7.(currently amended) The separation apparatus according to Claim 5 [[or 6]], wherein said external force imposing pattern is such as imposing external force so that the compartments expressing a positive external force component and the compartments expressing a negative external force component alternately appear along the sample forwarding direction of said channel.

8.(currently amended) The separation apparatus according to ~~any one of Claims 5 to 7~~ claim 5, wherein said channel has a bent geometry, and a bent portion of said channel configures said interception unit.

9.(canceled)

10.(currently amended) The separation apparatus according to ~~any one of Claims 5 to 9~~ claim 5, further comprising recovery units recovering said components-to-be-separated fractionated into said individual compartments from said interception units,

wherein said external force imposing unit imposes external force also between each of said recovery units and said interception units, so as to move said sample towards said interception unit during fractionation of said sample, and so as to move said sample towards said recovery unit during recovery of said sample.

11.(currently amended) The separation apparatus according to ~~any one of Claims 1 to 10~~ claim 1, wherein said plurality of compartments placed along the sample forwarding direction of

said channel are configured so that the one placed on the further downstream side of said channel has a larger length.

12. (currently amended) The separation apparatus according to ~~any one of Claims 1 to 11~~ claim 1, wherein said plurality of compartments placed along the sample forwarding direction of said channel are configured so that the one placed on the further downstream side of said channel is imposed with a smaller external force in said individual external force imposing patterns.

13. (canceled)

14. (canceled)

15. (canceled)

16. (original) A separation apparatus comprising:

a channel having a main channel and sub channels formed as being branched out from said main channel, through which a sample including components-to-be-separated moves; and

an external force imposing unit imposing external force to said components-to-be-separated so as to allow them to move through said channel,

wherein said external force imposing unit is configured so as to sequentially execute a plurality of external force imposing patterns differing in direction of imposition of the external force relative to said channel, and said apparatus is configured so as to fractionate said components-to-be-separated into any of said sub channels, through execution of said plurality of external force imposing patterns.

17. (original) The separation apparatus according to Claim 16, wherein said main channel has a sample introduction port; and

said sub channels are configured so as to have said components-to-be-separated introduced thereinto when said external force imposing unit imposes external force towards the sample introduction port, and so as to move said components-to-be-separated towards said main channel when said external force imposing unit imposes external force in the direction departing from said sample introduction port.

18. (canceled)

19. (canceled)

20. (canceled)

21. (original) A separation method using a separation apparatus comprising a channel through which a sample containing components-to-be-separated moves, a plurality of compartments provided to said channel, and an external force imposing unit imposing external force to said components-to-be-separated so as to allow them to move through said channel,

wherein said external force is repetitively imposed sequentially in the direction departing from a sample introduction position and in the direction approaching the position on said channel, to thereby fractionate said components-to-be-separated into any of said compartments.

22. (original) The separation method according to Claim 21, wherein said components-to-be-separated are fractionated into any of said compartments depending on migration ranges caused by imposition of said external force.

23. (currently amended) A separation method separating components in a sample using the separation apparatus described in ~~any one of Claims 1 to 15~~ claim 1, comprising:

a step of introducing said sample into said channel;

a first step of executing any one of said external force imposing patterns so as to move, within one compartment, said sample towards the downstream side of said channel;

a second step of executing any one of said external force imposing patterns so as to move, within one compartment, said sample towards the upstream side of said channel;

wherein these steps being sequentially repeated.

24.(original) The separation method according to Claim 23, wherein duration of time of imposing the external force is kept constant for every execution, in said external force imposing pattern in said first step.

25.(original) The separation method according to Claim 23, wherein duration of time of imposing the external force is kept constant for every execution, in said external force imposing pattern in said first step, and in said external force imposing pattern in said second step.

26.(currently amended) The separation method according to ~~any one of Claims 23 to 25~~ claim 23, wherein duration of time of imposing the external force in said external force imposing pattern in the second step is adjusted to substantially equal to, or longer than the duration of time of imposing the external force in said external force imposing pattern in the first step.

27.(canceled)

28.(canceled)

29.(canceled)

30. (currently amended) A separation method separating components in a sample using the separation apparatus described in ~~any one of Claims 16 to 20~~ claim 16, comprising:

a step of introducing said sample into said channel;

a first step of executing, in said main channel, any one of said external force imposing patterns so as to move said sample towards the downstream side of said channel;

a second step of executing, in said main channel, any one of said external force imposing patterns so as to move said sample towards the upstream side of said channel;

wherein these steps being sequentially repeated.

31. (original)) The separation method according to Claim 30, wherein in said external force imposing pattern in said first step, duration of time of imposing the external force is kept constant for every execution.

32. (canceled)

33. (canceled)

34. (currently amended) A system comprising an external force switching control unit executing the method described in ~~any one of Claims 21 to 33~~ claim 21.

35. (currently amended) A mass spectrometry system comprising:

a pre-treatment unit separating a biological sample depending on the molecular size or properties, and subjecting said sample to a pre-treatment for an enzyme digestion treatment;

a unit subjecting said sample pre-treated by said pre-treatment unit to the enzyme digestion treatment;

a drying unit drying the enzyme-digestion-treated sample; and

a mass spectrometry unit subjecting the dried sample to mass spectrometry, wherein said pre-treatment unit comprises a microchip described in any ~~one of Claims 1 to 20~~ claim 1.